

- b. computing a deviance of the data values for each cell of each cross-tab using formula (1):

$$d(i_1, \dots, i_d) = \frac{(n(i_1, \dots, i_d) - e(i_1, \dots, i_d))}{\sqrt{e(i_1, \dots, i_d)}} \quad (1)$$

where:

$n(i_1, \dots, i_d)$ is the actual value of the cell at location (i_1, \dots, i_d) ;

$s_k(i_k) = \sum_{j=1}^{D_k} n(i_1, \dots, i_j, \dots, i_d)$ is the sum of all cell values along the kth dimension;

$S = \sum_{j_1=1}^{D_1} \dots \sum_{j_k=1}^{D_k} \dots \sum_{j_d=1}^{D_d} n(j_1, \dots, j_d)$ is the total sum of all cell values in the cross - tab;

$e(i_1, \dots, i_d) = \frac{\prod_{j=1}^d s_j(i_j)}{S^{d-1}}$ is the estimated value for the cell at location (i_1, \dots, i_d) ;

d is the dimension of the cross - tab; and

D_k is the number of cells in the kth dimension; and

- c. ranking the deviances; and
d. selecting the cross-tabs containing the cell having a deviance, the absolute value thereof being greater than a desired value.

2.(original) The method of claim 1, further comprising the step of:
filtering or qualifying the cross-tabs based on sparsity where sparsity is the number of cells that do not or cannot have a value.

3.(original) The method of claim 1, further comprising the step of:
filtering cross-tabs k, where k is an integer having a value less than or equal to the dimension

74

1 of the cross-tab.

1 4.(original) The method of claim 1, further comprising the step of:
2 limiting the number of cross-tabs displayed.

1 5.(currently amended) A method implemented on a digital process unit for analyzing data in
2 a multi-dimensional dataset comprising the steps of :

- 3 a. selecting n variables from a multidimensional dataset, where n is an integer less than
4 or equal to the dimensionality of the dataset;
5 b. selecting a cross-tab dimension, m, where m is an integer having a value less than or
6 equal to n or having a range of values between a lower limit greater than to equal to
7 1 and an upper limit less than or equal to n;
8 c. constructing k cross-tabs of dimension m, where k is the number of combinational
9 cross-tabs derived from n variable taken m at a time; and
10 d. do ranking;
11 e. displaying a list of the ranked cells with cross-tab identification information;
12 f. selecting a desired cell from the list;
13 g. display the corresponding cross-tab with highlight cell.

2 6.(original) The method of claim 5, wherein list manipulation to display top x positive and
negatives with middle hidden.

1 7.(currently amended) A graphics windowing routine implemented on a digital process unit
2 for displaying data in a multi-dimensional dataset comprising:

3 a window including a pane and a drop down box associated with the pane designed to allow
4 selection between different pane display formats for the pane.

1 8.(original) The routine of claim 7, further comprising at least two pane, pane splitters separating
2 the panes and a drop down box associated with each pane designed to allow selection between
3 different pane display formats for each pane.

Page 3

RESPONSE TO AN EXAMINER'S REQUEST FOR AMENDED CLAIMS TO OVERCOME POTENTIAL SECTION 101 AND/OR
112, FIRST PARAGRAPH REJECTIONS
FAX NO.: 703-746-5731

ROBERT W. STROZIER, P.L.L.C.

9.(currently amended) A GUI implemented on a digital process unit for displaying, manipulating, and analyzing data in a multi-dimensional dataset comprising:

- a. a polyscope graphics routine; and
- b. a hierarchical value-based graphics routine
- c. a polystar graphics routine;
- d. a tree graphics routine;
- e. cross-tab pixel graphics routine; and
- f. surface routine.

10.(currently amended) A method implemented on a digital process unit for analyzing data in a multi-dimensional dataset comprising the steps of:

- a. generating a decision tree from a dependent cross-tab having a dimension m , where m is an integer having a value less than n where n equal to the total number of variable in a dataset and where the remaining variable are independent variables;
- b. searching the decision tree for dependent cross-tabs having corresponding relative cell values significantly different from the cell values in the root cross-tab to produce at least one interesting cross-tab; and
- c. converting each interesting cross-tab into a corresponding filtered dependent cross-tab where the filter represents the decision tree path leading to each interesting cross-tab.

11.(original) The method of claim 10, further comprising the step of:
display the decision tree as a hierarchical graphic or tree graphic;

12.(original) The composition of claim 10, further comprising the step of:
 selecting a node, and
 highlighting the dependent cross-tab in a cross-tab decision tree or changing the data in the single dependent cross-tab to correspond to the data in the selected node.

1 13.(currently amended) A method implemented on a digital process unit for constructing a
2 decision tree from data in a multi-dimensional dataset comprising the steps of:
3 selecting m dependent variables from a set of n variables, where n and m are integers and m
4 has a value less than n and the remaining n-m variable are independent variables;
5 converting the m dependent variables into a single hybrid variable;
6 display the hybrid variable as a dependent variable cross-tab; and
7 classifying the hybrid variable relative to the independent variables using a decision tree
8 classifier to form a decision tree of dependent variable cross-tabs.

1 14.(original) The method of claim 13, further comprising the step of:
2 selecting a node of the decision tree; and
3 performing cross-tab operations, where the cross-tab operations include at least one of the
4 graphics routines of the GUI of claim x.

1 15.(original) The method of claim 13, further comprising the step of:
2 analyzing each cross-tab to generate cross-tab data.

al
cont
1 16.(original) The method of claim 13, further comprising the step of:
displaying the cross-tab data in a hierarchical graphics routine.

1 17.(original) The method of claim 13, further comprising the step of:
2 constructing an equivalent cross-tab representation of the decision tree, where the cross-tab
3 representation comprises a plurality of dependent variable cross-tabs where the plurality is equal to
4 a product of a dimension of each independent variable where data in each dependent variable cross-
5 tab derives from the intersecting independent variables.

1 21.(currently amended) A method implemented on a digital process unit for visualizing a
2 Decision Tree representing data and data relationships derived from a multi-dimensional dataset, the
3 method comprising the steps of:
4 reading the Decision Tree Output Data from a Decision Tree algorithm and visually displaying said
5 Decision Tree Output Data using a Decision Tree Scatter Plot wherein the node-dept (level) is
6 represented on the X-axis and the number of records are represented on the Y-axis (preferably a
7 logarithmic scale).

1 22.(currently amended) An interface implemented on a digital process unit to a multi-
2 dimensional database (MDD) for pre-processing queries to the MDD and post processing results
3 from the MDD comprising a query receiver, a results sender, a query parser, a clause translator, a
4 command sender, a data receiver and an operational construct assembler, where both sender and
5 receiver can be combined into an exchanger and the parser and translator can be combined into a
6 disassembler.

Date: September 30, 2003

Respectfully submitted,

Robert W. Strozier, Reg. No. 34,024
Attorney for Applicants